IXYS
INTEGRATED CIRCUITS DIVISION

CPC1705Y

Single-Pole, Normally Closed 60V, 3.25A_{DC}, 4-Pin Power SIP Relay

Parameter	Rating	Units
Blocking Voltage	60	V_P
Load Current	3.25	A_{DC}
On-Resistance (max)	0.09	Ω

Features

- 3.25A_{DC} Load Current
- 60V Blocking Voltage
- 90mΩ Maximum On-Resistance
- 5mA Input Control Current to Activate
- 2500V_{rms} Input/Output Isolation
- Power SIP Package
- High Reliability
- Arc-Free With No Snubbing Circuits
- No EMI/RFI Generation
- Flammability Rating UL 94 V-0

Applications

- Transportation Railroad Controls
- Security
- Battery Backup Systems
- Industrial Controls
- Robotics
- Instrumentation

Description

The CPC1705Y is a 60V, 3.25A_{DC}, 0.09Ω DC-switching, normally closed (1-Form-B) Solid State Relay. To minimize printed circuit board space, this device is provided in IXYS IC Division's Power Single In-line package (PowerSIP).

Employing optically coupled MOSFET technology, the CPC1705Y provides 2500V_{rms} of input to output isolation. The relay output is constructed with an efficient MOSFET switch that utilizes IXYS Integrated Circuits Division's patented OptoMOS architecture. A highly efficient infrared LED at the input controls the optically coupled output.

The combination of low on-resistance and high load current capability makes this relay suitable for a variety of high performance switching applications.

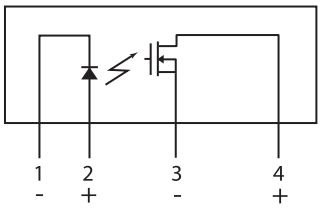
Approvals

- UL 508 Certified Component: File E69938
- CSA Certified Component: Certificate 1172007

Ordering Information

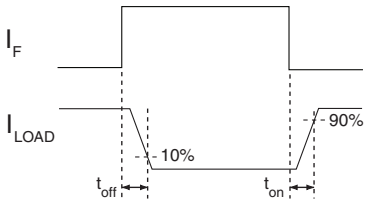
Part #	Description
CPC1705Y	4-Pin (8-Pin Body) Power SIP Package (25 per tube)

Pin Configuration



Switching Characteristics of Normally Closed Devices

Form-B



Absolute Maximum Ratings @ T_A=25ºC (Unless Otherwise Noted)

Parameter	Ratings	Units
Blocking Voltage	60	V_P
Reverse Input Voltage	5	V
Input control Current	50	mA
Peak (10ms)	1	A
Input Power Dissipation [1]	150	mW
Total Power Dissipation [2]	1175	mW
Isolation Voltage, Input to Output	2500	V_{rms}
ESD Rating (Human Body Model)	4	kV
Operational Temperature	-40 to +85	°C
Storage Temperature	-40 to +125	°C

[1] Derate linearly 3.33 mW / ºC
[2] Derate Output Power linearly 11.8 mW / ºC

Absolute Maximum Ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at conditions beyond those indicated in the operational sections of this data sheet is not implied.

Typical values are characteristic of the device at +25°C, and are the result of engineering evaluations. They are provided for information purposes only, and are not part of the manufacturing testing requirements.

Electrical Characteristics @ T_A=25ºC (Unless Otherwise Noted)

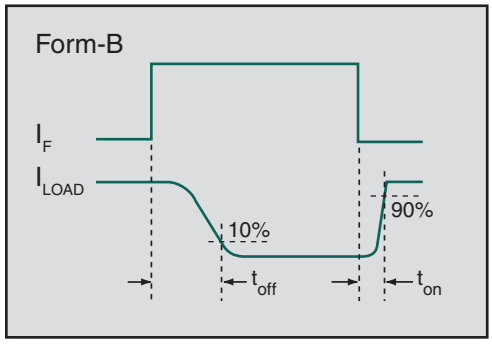
Parameter	Conditions	Symbol	Min	Typ	Max	Units
Output Characteristics						
Load Current, Continuous [1]	Free air	I_L	-	-	3.25	A_{DC}
Peak Load Current	t=10ms	I_{LPK}	-	-	3.25	A
On-Resistance [2]	I_L=1A	R_{ON}	-	0.059	0.09	Ω
Off-State Leakage Current	I_F=5mA, V_L=60V_{DC}	I_{LEAK}	-	-	1	µA
Switching Speeds						
Turn-On Output Switch	I_F=10mA, V_L=10V (See Switching Waveform)	t_{on}	-	0.6	2	ms
Turn-Off Output Switch		t_{off}	-	2.84	12	
Output Capacitance	I_F=10mA, V_L=20V_{DC}, f=1MHz	C_{OUT}	-	1	-	nF
Input Characteristics						
Input Control Current to Activate [3]	I_L=0A	I_F	-	0.8	5	mA
Input Control Current to Deactivate	I_L=1A	I_F	0.1	0.8	-	mA
Input Voltage Drop	I_F=5mA	V_F	0.9	1.2	1.5	V
Reverse Input Current	V_R=5V	I_R	-	-	10	µA
Input/Output Characteristics						
Capacitance, Input-to-Output	V_{IO}=0V, f=1MHz	C_{IO}	-	2	-	pF

[1] Derate linearly 20.5 mA/ºC.
[2] Measurement taken within 1 second of on-time.
[3] For high-temperature operation (T_A > 60ºC) a minimum LED drive current of 10mA is recommended.

Thermal Characteristics

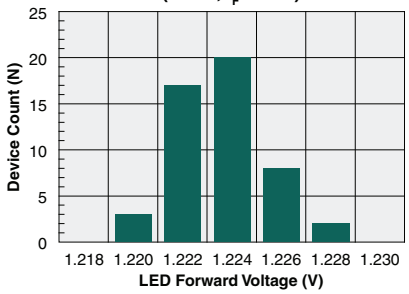
Parameter	Symbol	Rating	Units
Thermal Impedance (Junction to Ambient)	θ_{JA}	85	°C/W

Switching Waveform

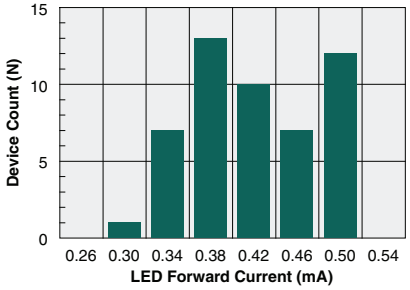


PERFORMANCE DATA*

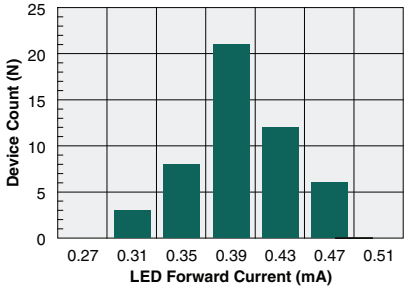
Typical LED Forward Voltage Drop (N=50, I_F=5mA)



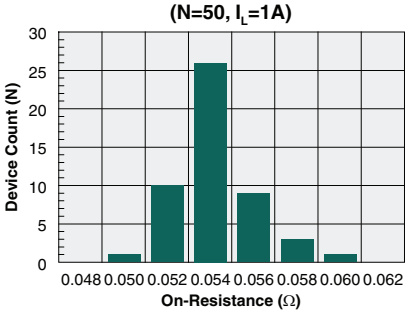
Typical I_F for Switch Operation (N=50)



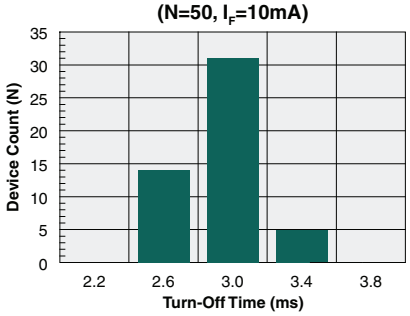
Typical I_F for Switch Dropout (N=50)



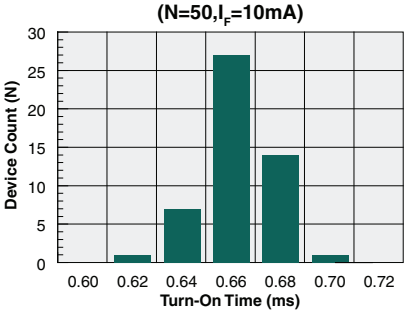
Typical On-Resistance Distribution (N=50, I_L=1A)



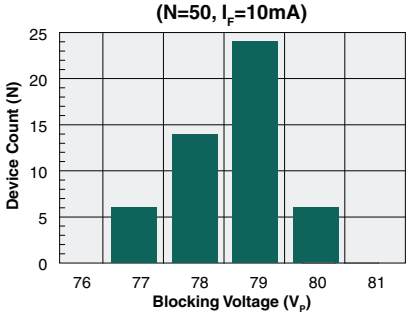
Typical Turn-Off Time (N=50, I_F=10mA)



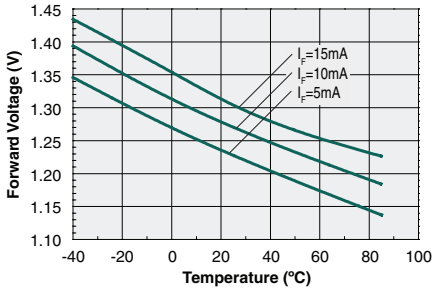
Typical Turn-On Time (N=50,I_F=10mA)



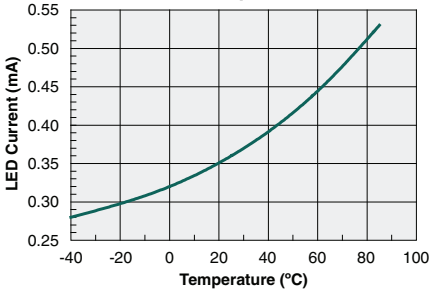
Typical Blocking Voltage Distribution (N=50, I_F=10mA)



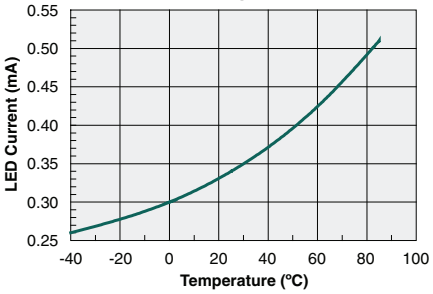
Typical LED Forward Voltage Drop vs. Temperature



Typical I_F for Switch Operation vs. Temperature



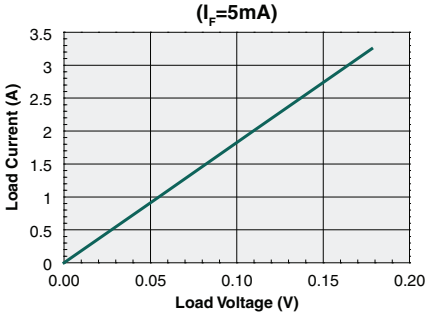
Typical I_F for Switch Dropout vs. Temperature



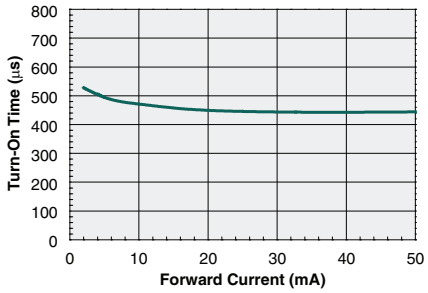
*The Performance data shown in the graphs above is typical of device operation. Unless otherwise noted, data is presented at 25°C.
For guaranteed parameters not indicated in the written specifications, please contact our application department.

PERFORMANCE DATA*

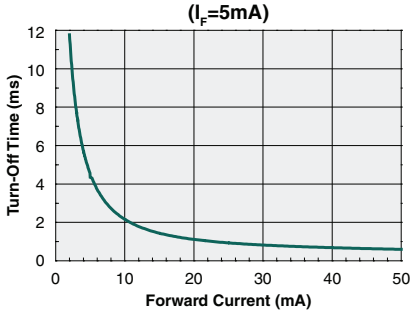
Typical Load Current vs. Load Voltage (I_F=5mA)



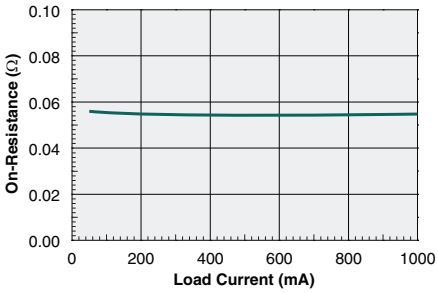
Typical Turn-On Time vs. LED Forward Current



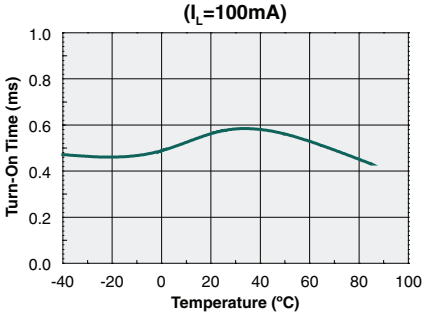
Typical Turn-Off Time vs. LED Forward Current (I_F=5mA)



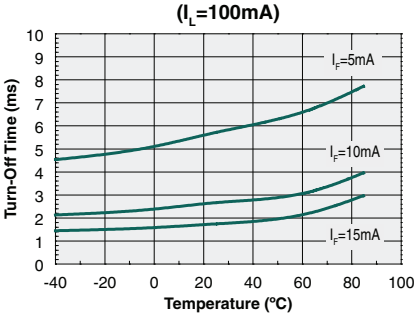
Typical On-Resistance vs. Load Current



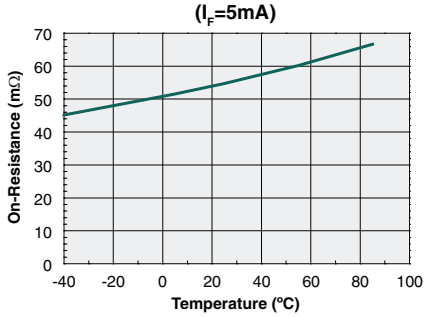
Typical Turn-On Time vs. Temperature (I_L=100mA)



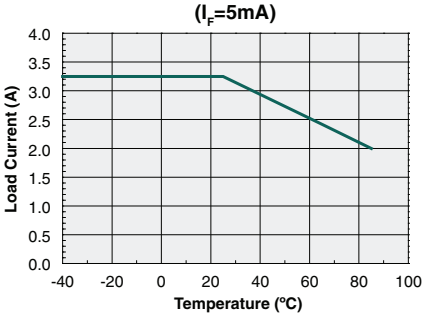
Typical Turn-Off Time vs. Temperature (I_L=100mA)



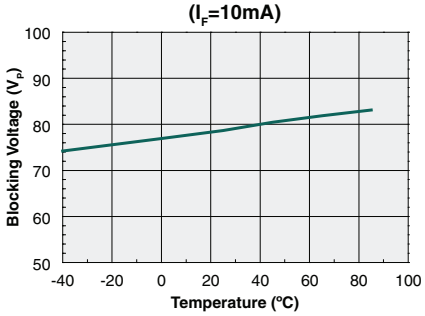
Typical On-Resistance vs. Temperature (I_F=5mA)



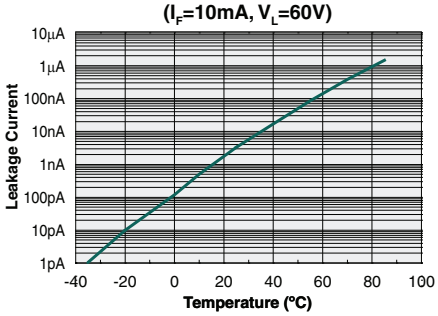
Maximum Load Current vs. Temperature (I_F=5mA)



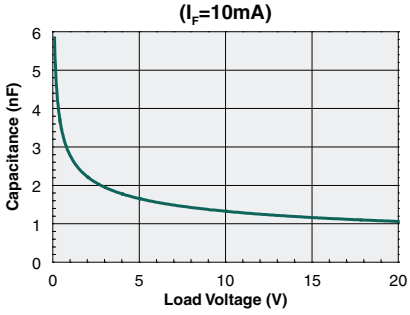
Typical Blocking Voltage vs. Temperature (I_F=10mA)



Leakage Current vs. Temperature (I_F=10mA, V_L=60V)



Output Capacitance vs. Load Voltage (I_F=10mA)



*The Performance data shown in the graphs above is typical of device operation. Unless otherwise noted, data is presented at 25°C.
For guaranteed parameters not indicated in the written specifications, please contact our application department.

Manufacturing Information

Moisture Sensitivity

All plastic encapsulated semiconductor packages are susceptible to moisture ingression. IXYS Integrated Circuits Division classifies its plastic encapsulated devices for moisture sensitivity according to the latest version of the joint industry standard, **IPC/JEDEC J-STD-020**, in force at the time of product evaluation. We test all of our products to the maximum conditions set forth in the standard, and guarantee proper operation of our devices when handled according to the limitations and information in that standard as well as to any limitations set forth in the information or standards referenced below.

Failure to adhere to the warnings or limitations as established by the listed specifications could result in reduced product performance, reduction of operable life, and/or reduction of overall reliability.

This product carries a Moisture Sensitivity Level (MSL) classification as shown below, and should be handled according to the requirements of the latest version of the joint industry standard **IPC/JEDEC J-STD-033**.

Device	Moisture Sensitivity Level (MSL) Classification
CPC1705Y	MSL 1

ESD Sensitivity

This product is **ESD Sensitive**, and should be handled according to the industry standard **JESD-625**.

Soldering Profile

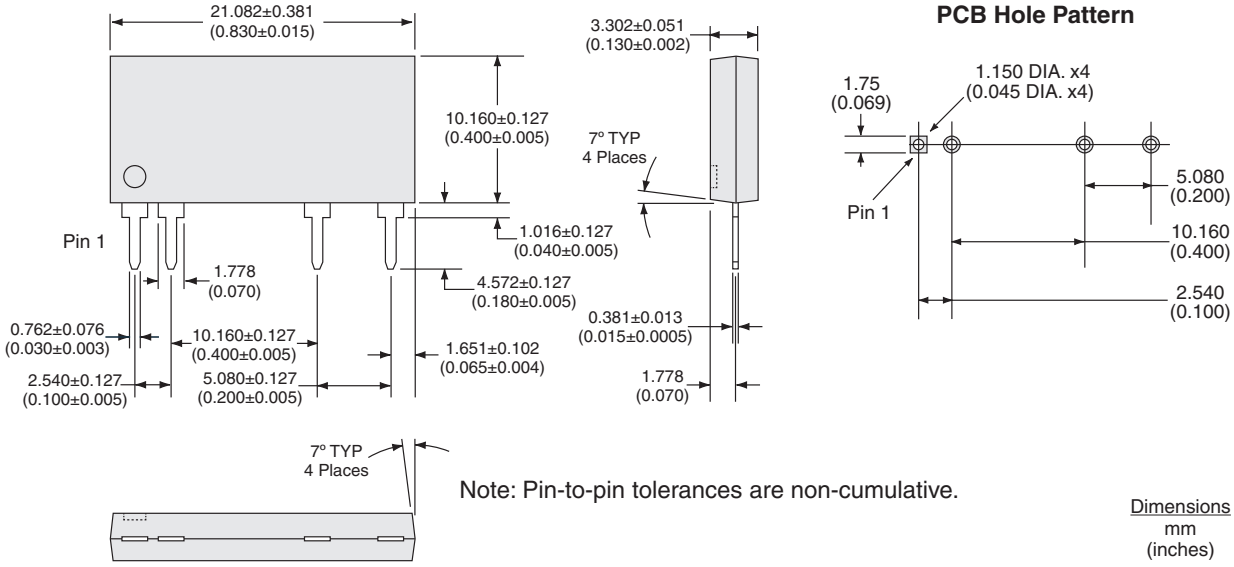
Provided in the table below is the Classification Temperature (T_C) of this product and the maximum dwell time the body temperature of this device may be (T_C - 5)°C or greater. The classification temperature sets the Maximum Body Temperature allowed for this device during lead-free reflow processes. For through-hole devices, and any other processes, the guidelines of **J-STD-020** must be observed.

Device	Classification Temperature (T_c)	Dwell Time (t_p)	Max Reflow Cycles
CPC1705Y	245°C	30 seconds	1

Board Wash

IXYS Integrated Circuits Division recommends the use of no-clean flux formulations. Board washing to reduce or remove flux residue following the solder reflow process is acceptable provided proper precautions are taken to prevent damage to the device. These precautions include, but are not limited to: using a low pressure wash and providing a follow up bake cycle sufficient to remove any moisture trapped within the device due to the washing process. Due to the variability of the wash parameters used to clean the board, determination of the bake temperature and duration necessary to remove the moisture trapped within the package is the responsibility of the user (assembler). Cleaning or drying methods that employ ultrasonic energy may damage the device and should not be used. Additionally, the device must not be exposed to flux or solvents that are Chlorine- or Fluorine-based.

MECHANICAL DIMENSIONS



Note: Pin-to-pin tolerances are non-cumulative.

Dimensions
mm
(inches)

For additional information please visit our website at: www.ixysic.com

Specification: DS-CPC1705-R02

10/10/2017

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